

94/09

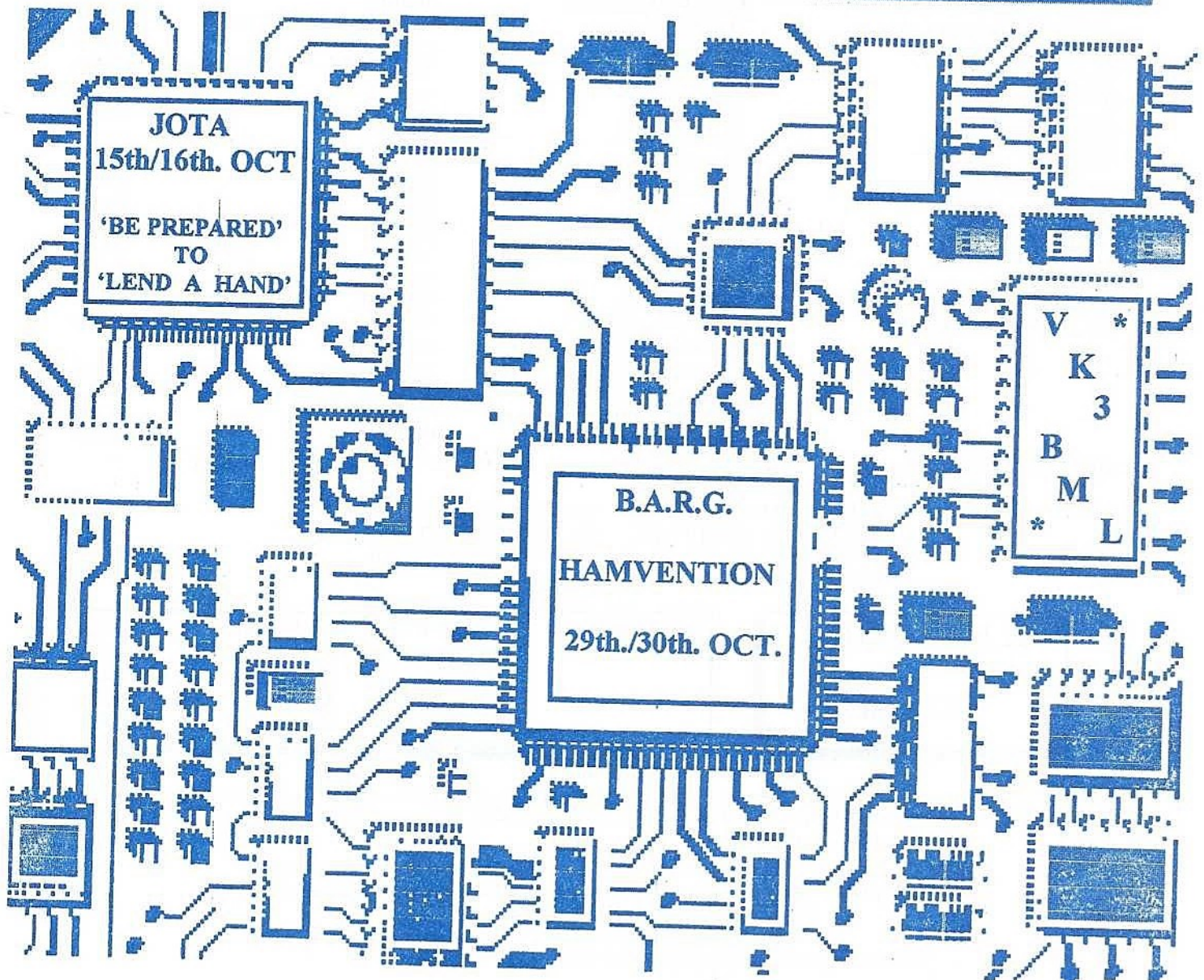
SEPTEMBER 1994



Vol.17 No.5

B.A.R.G. NEWS

OFFICIAL NEWSLETTER OF THE BALLARAT AMATEUR RADIO GROUP INC.



**HOMEBREW COMPETITION - BARG HAMVENTION - OCT 30TH.
ENTER YOUR FAVOURITE PROJECT - GOOD PRIZES.**



BALLARAT AMATEUR RADIO GROUP INC.

OFFICE BEARERS - 1994 / 1995

			WORK	HOME
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VICE PRESIDENT	GORDON CORNELL	VK3FGC	391135	392427
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TREASURER	HARRY HEKKEMA	VK3KGL		357563
MEMBERSHIP SECRETARY	NORM D'ANGRI	VK3LBA		341613
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TECH. OFFICER (DIGITAL)	TOM GEORGE	VK3DMK	327234	
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MEMBERS' REP.	REG CARTER	VK3CAZ		417585
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AWARDS MANAGER	MAURIE BATT	VK3XEX		422245
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PROPERTY OFFICER	JEFF PIGDON	VK3PAP	311211	327041
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	TOM GEORGE	VK3DMK	327234	
	DICK ANTOZIEWICZ	VK3AEX		323273
	IAN McDONALD	VK3AXH		
	DICK FORRESTER	VK3VU	337080	357663
	DAVID McCONNELL	VK3YNB		
	BEN ORCHARD	VK3TOP		377836
	DEAN SPEEDIE	VK3LDS		332741
	TOM GEORGE	VK3DMK	327234	

LIFE MEMBERS:

MAURIE BATT (VK3XEX) IAN McDONALD (VK3AXH)
 GEORGE SMALL (VK3DKJ) SK JIM WRIGHT (VK3CFB)
 KEVIN HUGHES (VK3WN) PHIL SEDDON (VK3AQM)
 STAN WIDGERY (VK3SE)

CLUB STATION

VK3 BML

REPEATERS

VK3RBA (Voice) 146.750 MHz. - Mt.Buninyong.
 VK3RBS (Voice) 146.900 MHz. - Smeaton Hill
 VK 3RPC (Packet) 144.750 MHz. - Mt. Warrenheip.
 VK3RBU (Voice) 438.475 MHz. - Mt.Hollowback.
 VK3RMB (Beacon) 432.535 MHz. - Mt.Buninyong

ACTIVITIES

CLUB NET: Thursday nights at 8 pm. (8.30 pm during Daylight Saving). Freq: 3.610 MHz +/- QRM.
 2 METRE SCRAMBLE: Sunday Nights at 7.50 pm. Freq: 146.425 to 146.600 MHz. Inc.
 Call back held on VK3RBA 146.750 MHz.

Logs monthly to D.Quirk - P.O. Box 78 - Newstead 3462 (or Meeting) to qualify.

MEETINGS: General Meeting : Last Friday of each month (except December) at 7.30 pm.

Natter Night : 2nd Friday of each month.

Venue: Community Education Centre - Hopetoun St. Ballarat.

FOX HUNTING: As arranged during the year.

PLEASE ADDRESS ALL CORRESPONDENCE to:

The Secretary - BARG Inc.
 Box 1261
 Mail Centre
 Ballarat 3354

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FROM THE SECRETARY'S DESK



MINUTES OF MEETING HELD 26th.AUGUST 1994.

The meeting was opened at 7.35pm.

In his opening address, our newly elected President - Bob VK3BNC, welcomed the members and congratulated the Office Bearers and wished them well in their new positions.

APOLOGIES: were accepted on behalf of the following VK3's : FRO, FR, SE, CIS, AEX, DMK, NBM, EF, XEX, NAS, NIZ, and JFL.

(AAI/XDG)

(CFB/CCB)

MINUTES: of the July meeting were tabled and confirmed.

CORRESPONDENCE:

IN:

- Letter from WIA re ATV repeater approval.
- Newsletters from: Geelong ARC, Illawarra ARC, Hervey Bat ARC, West. & North. Suburbs ARC, WICEN News, Emtronics, Dick Smith Electronics.

OUT:

- Emtronics.
- Ballarat Trophies.
- W.I.A.

TREASURER'S REPORT: was circulated and accepted. The General Account balance was noted at \$415.64

(KGL/ANH)

OSL CARDS Nil cards received this month.

TNX Doug.

PUBLICITY: Norm VK3LBA spoke of pre Hamvention preparations and the near completion of the entrance 'handout', and the completion of the AR insert.

TNX Norm.

EDUCATION: Reminder of Regulations Exam on 8th. September.

TNX Tom

AWARDS: Nil applications this month. (Hope you are well soon Maurie.)

TECHNICAL COMMITTEE: Vital meeting later this month.

TNX Dick.

CLUB NET: Great DX on 80M. Enjoyable QSO's on Western Zone Hookup.

WICEN: Reminder of Daylesford Car Rally in November.

SCRAMBLE: Congratulations to Doug VK3KAY (1st.) Reg VK3CAZ (2nd.) and Cliff VK3CCB (3rd) in the 1993/4 competition. Daryl VK3XDQ was appointed Scramble Co-Ordinator for logs.

New rules were posted requiring all logs to be posted or hand delivered to the co-ordinator prior to or at the monthly meeting. Logs not received by each meeting night will not be included in aggregate.

GENERAL BUSINESS:

- No nominations received for position of 'catering officer'.
 - Members badges on order (ANH/CAZ)
 - Purchase of SWL Analyser - MFS-UHF @ \$225.00 (DCS/CAZ)
 - ATV REPEATER REPORT: Kit from VK5 @ \$200.00. Freq.shift :- TX to 1250MHz, RX to 444.250 MHz. - Notification to relevant parties. (TOP/DCS)
 - Delete electronic call book proposal (VK) (FGC/DCS)
 - Remembrance Day Contest entries due. (Cliff VK3CCB to post.)
 - Suggested Bus Trip to Geelong Junk Night. (AAI/FD)
 - Free passes to be allocated for Hamvention as requested. (Students etc.) (DCS/TOP)
 - Lengthy and spirited discussion on viability of BARG commitment to a BBS. Decision deferred and advice to be sought from expert sources. (LU/FD)
- Letter to WIA requesting advice on "special project" resources.
- The following volunteered to assist at JOTA - DCS, BNC, CCB, FGC, FMC, ANH, CFH, ZHH (from home QTH) Use of rig - VK3WN.

The meeting concluded at 9.30pm. NEXT MEETING Sept.30th. 73 de Geoff VK3ADB.



THEY SAY THAT:

- * ELVIS has logged off !
- * IF the enemy is in range - so are you !
- * Dog biscuits are made from Collie Flour !
- * POLI means *many*.
TICS means *blood sucking parasites*. Politics ?

COMING EVENTS

September 21	BARG Committee Meeting
September 30	BARG General Meeting
October 1st/2nd.	VK/ZL/Oceania DX Phone Contest
October 12	LADIES NIGHT OUT - BLUE BELL
October 14	BARG Natter Night
October 15/16th.	J.O.T.A.
October 19	BARG Committee Meeting
October 28	BARG General Meeting
October 29 / 30	BARG Hamvention
November 5	Car Rally - "Sprint" (WICEN Event)
November 11	BARG Natter Night
November 12	ALARA Contest
November 16	BARG Committee Meeting
November 25	BARG General Meeting (Last for 1994)
December 9	BARG Natter Night (Last for 1994)



COMMITTEE MEETINGS

BARG Office Bearers are reminded that monthly Executive Committee Meetings are held on the Wednesday night during the week prior to the General Meeting. (See Events Calendar.)

The meetings commence at 7.30 pm. at the Education Centre Hopetoun St. and all Office Bearers are asked to attend, and assist by adding their expertise to the discussions.

Members are invited to address their queries to the Members' Representatives, or in the case of a specific topic, to attend the meeting and voice their opinion or state their case.

The Committee is mindful of their responsibilities to the Members, and the greater the input of interested parties, the more likely it will be that we can achieve the correct results.

TNX de Bob VK3BNC
President BARG.

LOOKING FOR SOME REALLY GOOD HF GEAR ?



- * How about a YEASU FT 757-GX11 HF Transceiver in Very Good Condition

A BARGAIN AT \$850.00

CONTACT VK3NIZ (Ted) ☎ 053-323340 - ANY TIME

- * NOT LICENCED YET, BUT WANT TO LISTEN AROUND THE BANDS ?

This may be for you: TRIO KENWOOD RECEIVER (Amateur Bands Only)
In really good condition \$250.00

CONTACT VK3NAS (Alan) ☎ 053-355600



94/09

The President Reports



With a somewhat unusual start to my Presidential year, I would like to say how I am looking forward to another exciting year in what must be one of the more "doing" Amateur Radio Clubs.

Having seen quite a number of Amateur Radio Clubs, Hamfests etc. I think that we can look back over the achievements of B.A.R.G. with a great deal of pride. Known as the 'friendly club' and an affiliate club of the Wireless Institute of Australia.

Some of the more tangible things provided;

- Voice and packet repeater facilities
- Novice and full call upgrading courses
- QSL inwards/outwards handling service
- Club Newsletter
- WICEN activities
- Technical Library
- An examination service
- Equipment borrowing service
- Weekly nets
- Technical backup for members
- Club awards.
- Free coffee at all meetings !

I know that you would all wish me to pass on to Cliff VK3CCB and his team our congratulations for a great past year.

The committee has decided to produce a monthly Newsletter up until Christmas, to keep members informed of coming events. These include the JOTA weekend at Pax Hill, and the Hamvention on October 30th. Both of these events will require your assistance.

The "Ladies Night Out" has again been arranged in appreciation of their efforts at the Hamvention. It will be held on October 12th. in the Bluebell Hotel at 6.30pm. Those ladies wishing to attend please contact Betty Terrill on 395317 as bookings are required.

In view of our current discussions on a local packet Bulletin Board, Peter Hallgarten VK3AVE has kindly offered to address any questions that you may have, about the future of packet radio in our area, at our next meeting.

Might I recommend our 'Natter Night' to members as a very informal 'get together' over a cuppa and perhaps discuss some of your technical worries. The second Friday after our meetings at the Education Centre Hopetoun St.

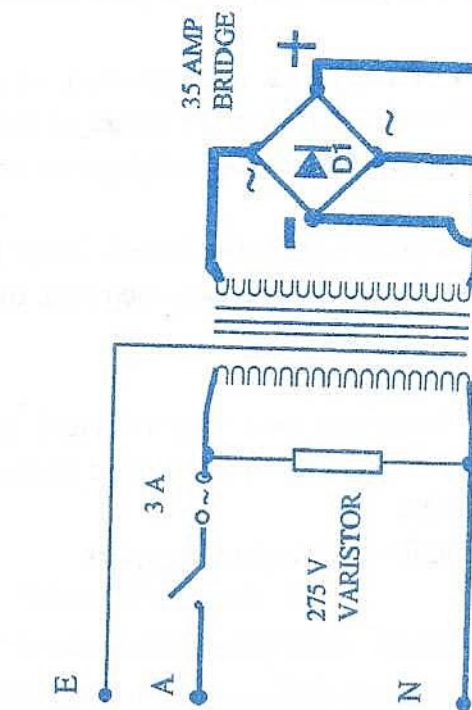
Looking forward to your support

73 de Bob VK3BNC

STOP PRESS: AOCP upgrade coaching. Are you interested ?

Please contact Education Officer Tom VK3DMK.

13.8 V. 20 AMP POWER SUPPLY VK3CAZ - VK3JEM



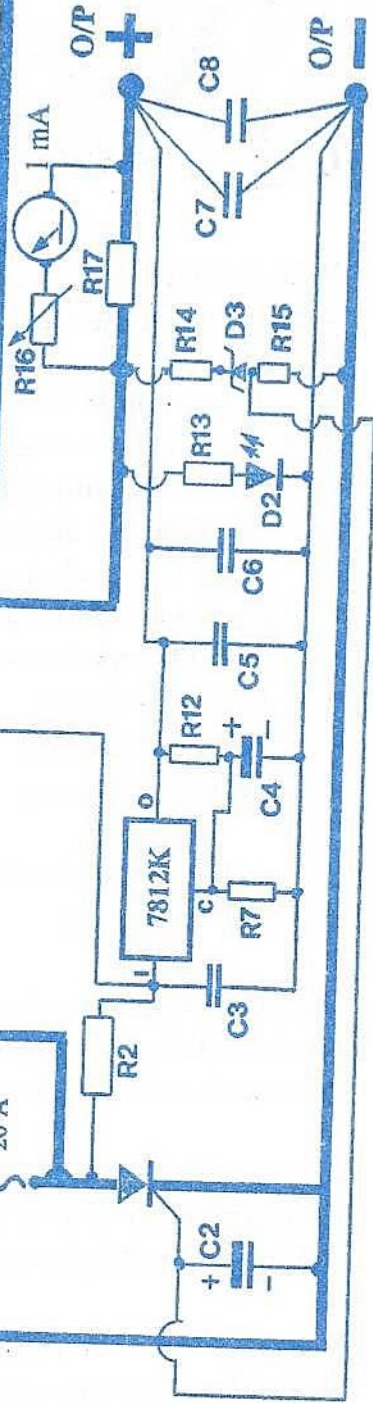
BE AWARE
TAKE CARE



Drawn by VK3LBA - 25/8/94

COMPONENT LIST

R1	270 ohm 5 Watt	C1	50,000 µf (see text)
R2	3R3 5 Watt	C2	1 µf Tant.
R3,R4,R5,R6.	0.1 ohm 5 Watt	C3	.33 µf Cer.
R7	68 ohm 1 Watt	C4	10 µf Tant.
R8, R9, R10, R11.	82 ohm 1 Watt	C5	.01 µf Cer.
R12	560 ohm 1 Watt	C6	100 pf Cer.
R13	1000 ohm 1 Watt	C7	100 pf Cer.
R14	10 ohm 1 Watt	C8	1000 pf Cer.
R15	1000 ohm 1 Watt	D1	35 Amp Bridge Rect.
R16	1000 ohm Lin Pot	D2	Red LED - Power On
R17	.033 ohm 15 Watt (3 x 0.1 ohm 5Watt wired in parallel)	D3	1N965 Zener Diode.
	Fuses: 3 A (Slow Blow) 20A(Fast Blow)	Q1, Q2, Q3, Q4	MJ2955 Pass T'sistors
	Varistor - V275LA20A	SCR	CI22E (8 A.)
	0-1mA Meter	7812K	12V 3 Terminal Regulator
	Heatsinks, fuse holders, switch, terminals.	Power Trans.	(See Text)



94/09



A 'JEM' OF A POWER SUPPLY (with apologies to Les.) from Reg VK3CAZ

This power supply will, if fitted with a suitable transformer, deliver 20 amps without distress, although if it is to be used for RTTY or packet operation it might be a good idea to mount a 'muffin fan' and shrouding arranged to pass cooling air over the pass transistors and, if possible, the rectifier.

Note that if you pay 'rubbish' prices for the pass transistors then that is exactly the quality of transistor that you will get! So it is better to pay a little extra for good ones that don't require a vast amount of base current in order to pass the required amount of collector current.

Courtesy of Les VK3JEM the artwork for the PCB of the regulator and sensing section of the power supply is available if you need it, while the majority of the other components can be mounted on the heatsinks with the pass transistors.

A few notes on the values and construction. Referring to the circuit diagram of the unit, please note that for the best results the feed to the regulator board (both positive and negative leads) should be taken from the output terminals (literally). That means that the whole regulator is providing an output of 13.8 volts AT THE OUTPUT TERMINALS which is where we want it, not relying on some other reference point and so risking a voltage drop due to component and wiring losses outside the control loop. So feed the regulator board from the output terminals / socket. Likewise the 100pf and 1000pf ceramic bypass capacitors are also mounted right at the output point so as to keep RF out of the unit. Mount them there, not buried somewhere inside the unit or on the regulator board.

The wiring shown in heavy line is rated at 30 amperes minimum and ideally should be heavier. Remember that each voltage drop within the control loop is increasing the "headroom" required for proper operation of the regulator.

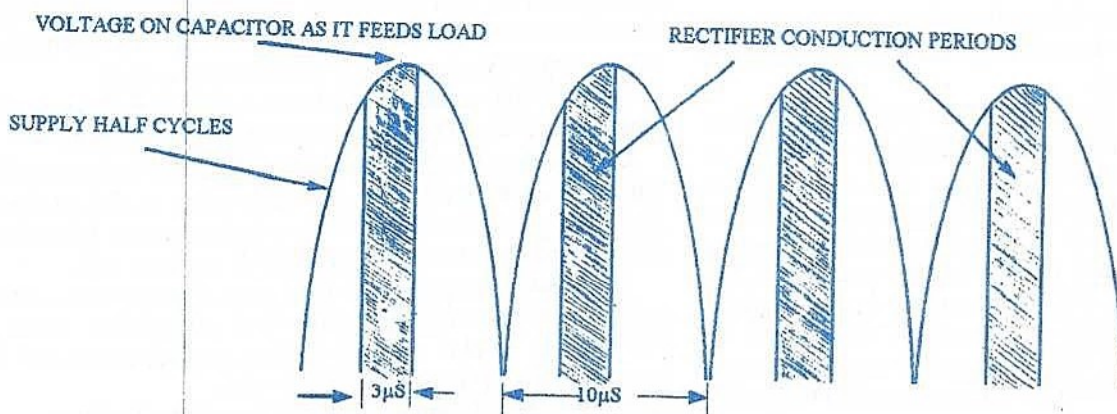
One temptation when building a power supply is to assume that the larger the value of the filter / reservoir capacitor, the better the results. This is far from being the fact! It is quite easy to fit such a large capacitor that the rectifier is overloaded and so you risk destroying it, most of the power supply, and possibly even the rig connected to it!

Consider the charging and discharging of the filter capacitor as shown below, when the load is drawing 20 amps.

Only during the 3 mSec or so is the transformer / rectifier delivering current to the capacitor, but the load is drawing its 20 amps for the entire 10 mSec period of the waveform (at 50Hz.), so that during the 3 mSec period the supplied current is effectively $10/3 \times 20 = 66$ amps. Hence the need for HEAVY wiring of the leads throughout the power supply, BUT ESPECIALLY that wiring from the transformer secondary through to the capacitor. Also remember that these values of current have to flow into (and out of) the capacitor itself. That means thick foils and wire within the capacitor, and explains why suitable units are so big physically.

Now let us suppose that we double the size of the filter capacitor to "improve" the smoothing. (Please note that the Maths are a bit 'rubbery' but will be accurate enough for our purposes.) All we effectively do, in doubling the capacitor size, is to reduce the conduction period of the rectifier and so increase the peak current demanded. If we reduce the conduction period to 1.5 mSec (approx) by this doubling of capacitor size, then the current goes up to around about 130 amps. However the manufacturer does set out in his data sheets a value for the Max. Forward Current Peak (repetitive) (I_{FRM}) of the diode / rectifier bridge and that value is one we may now be exceeding. Consequently we may be inviting the rectifier to breakdown and destroy itself if we keep on increasing the value of the filter capacitor.

Even worse than that is the fact that at "switch on", when the capacitor is fully discharged, the rectifier has to really work overtime to bring the capacitor up to its charged state. It may take several cycles of the supply to fully charge the capacitor, and again, remember that the diode manufacturer also specifies for his product the maximum current peaks (non-repetitive) (I_{FSM}) that can be handled, and also for how many cycles of the supply this can be permitted before the rectifier is liable to cry "quits" and go dead short circuit. Believe me a diode failing under load conditions like these ALWAYS goes dead short, so just imagine what some 25-30 volts (peak) of AC is going to do to your P.S.U. (and your rig if it is turned on) especially since the transformer can supply 20 amps! Of course the better the quality of the transformer you have fitted the more likely the rectifier is to fail if the capacitor is too large, since a good transformer will provide very little limit to the secondary ➤



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A 'JEM' OF A POWER SUPPLY (cont'd)



current because its resistance is negligible and the only opposition to current flow is really the forward voltage drop of the rectifier and iron losses etc. in the transformer. So beware of adding an extra few thousand microfarads to that new "you beaut" power supply lest you destroy it completely.

There is a simple way of calculating a suitable value of filter capacitor which is really quite accurate despite some 'shortcut' and 'dodgy' arithmetic.

If the transformer maximum output voltage is known (and this can be measured) and the minimum 'headroom' voltage is also known and is added to the required output voltage, then that gives us a value for the available "sag" in the voltage of the filter capacitor between recharges.

It is a close enough approximation for our purposes to consider the discharge of the capacitor as linear and also forget the period of time, approximately 3 mSec, during which the supply is recharging the capacitor. Going back to basics, we know that the duration of the mains half-cycle is 10 mSec and during that time the supply must provide 20 amps (at full load).

Now 1 amp for 1 second is one Coulomb, so for 20 Amps and 10 mSec the quantity of energy is:

$$20A \times 0.01 \text{ Sec} = 0.2 \text{ Coulomb.}$$

That is the energy taken from the capacitor each half-cycle (approximately). Since the capacitor must not fall below the minimum 'headroom' value for the regulator, and it starts from the maximum value reached by the transformer - rectifier (with all its losses if known) we can calculate the minimum size of the capacitor that will meet our requirements. If we assume a good transformer, such as the excellent 20 Amp one made available by the M.D.R.C. at a very reasonable price, we can make a few calculations.

Using this transformer as an example, we find that, rectified and loaded down to 20 Amps output, we can get a voltage at the capacitor of +28v - 2v - 1.4v, with the 2v loss due to the regulation of the transformer and 1.4v due to the voltage drop across the rectifier bridge, leaving us with a maximum voltage of around 24.6 volts.

If we allow 4v of 'headroom' for the regulator (a value of between 3 or 4 volts is reasonable) then the minimum voltage on the capacitor must be approximately 18 volts (about 14 volts for the output and 4 volts for the 'headroom').

So in 10 mSec the voltage from the capacitor must not fall more than 24.6 - 18 volts, say 6.6 volts, if the regulator is to be still in control.

From our basic theory we know that in a capacitor $Q = CV$ where Q = charge in Coulombs, C = capacity in Farads and V = voltage on plates, so if we re-arrange the formula we have $C = Q/V$, and substituting our values we get $C = 0.2/6.6$ Farads or 30,000 microfarads. As long as the capacitor is of good quality and just exceeds 30,000 microfarads it will do the jobs adequately, and if we select a sufficiently rated rectifier we should not overstress it. Allowing for ageing, tolerances etc. a value of around 35,000 to 40,000 microfarads (in this case) will be quite

sufficient and is a good choice. Use a greater value than that and the possibility of running in to trouble raises its head.

If the power supply maximum rating differs from this example this method can be used to calculate the value of the capacitor required. It tends to err on the 'safe side' so the calculated value will be quite large enough.

With the crowbar circuit the zener diode chosen is 15 volts since that is low enough to protect the rig, which is 13.8 volts +/- 10%, but high enough not to suffer from spurious triggering in transients, costing fuses.

For peace of mind you might like to test the crowbar to see the exact trip point. To do this, wire two 12 volt globes in series and insert them in the lead from the anode of the SCR to the fuse, (you will need two globes because the filter capacitor voltage will be about 25 - 28 volts.) Disconnect the 10 ohm resistor from the positive output lead and connect it to the wiper of a potentiometer of about 10kohm. Connect the ends of the potentiometer track, one to the negative rail, and the other to the positive terminal of the filter capacitor. Turn the pot so that the wiper of this temporary potentiometer is down at the negative end of the track and turn the power supply on. Slowly, very slowly, wind the potentiometer up, with a voltmeter connected between the negative rail and the wiper, so you can monitor the voltage on the wiper. Slowly increase the voltage until the lamps light as the SCR triggers. Note the voltage reading - that is the crowbar trip voltage. If it is not right, either change the zener diode or if it is tripping at too low a value, then try putting a forward biased diode between the 10 ohm resistor and the zener diode. If you use 1N914 diodes each one will add about 0.6 volts to the voltage needed to trip the crowbar. Once the circuit has tripped you will have to turn the power supply off to reset it, so that will remind you to fit 270 ohm 5 watt discharge resistor across the filter capacitor. Don't forget to fit that resistor as it can make a mess of a screwdriver or meter prod if you short out 40,000 microfarads charged to 30 volts or so. Not only that but the fright you get will ensure that you remove your hand from the area very quickly and always via the screws/tags/burrs in the unit, so causing maximum damage to the skin on your hand. So fit it for safety's sake!

Don't forget to remove the temporary globes from the SCR anode circuit and also reconnect the input of the crowbar to the positive output rail of the power supply.

The 0.033 ohm 15 watt resistor used as a meter shunt is, in fact, three off 0.1 ohm 5 watt connected in parallel. Remember that this meter shunt must be connected within the control loop or the output voltage will vary with the load current.

The 275 volt varistor will take care of voltage spikes in the mains so they don't cause problems for the transformer.

Do not forget that at 20 Amp load output the bridge rectifier will be dissipating 28 watts so it gets rather warm and needs heat sinking, just as much as the pass transistors. Either bolt it down firmly to the metal case, or fit it to a heat sink.

If the output voltage is too high then shunting the 68 ohm resistor in the common lead of the 7812 will reduce it. Putting 560 ohms in parallel with the 68 ohm gives 61 ohms and, in one unit, reduced the output to 13.6 volts.

ANY QUERIES ? Contact me and if I can help, I will. 73.

94/09

9

B.A.R.G. - EVENTS CALENDAR

NATTER NIGHT - COMM. MEETING - MEETING

AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

Friday 12th.
Friday 9th.
Friday 14th.
Friday 11th.
Friday 9th.

BOLD
Wednesday 17th.
Wednesday 21st.
Wednesday 19th.
Wednesday 16th.

Friday 26th.
Friday 30th.
Friday 28th.
Friday 25th.

JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY

Friday 10th.
Friday 10th.
— (Good Friday)
Friday 12th.
Friday 9th.
Friday 14th.

Wednesday 15th.
Wednesday 22nd.
Wednesday 19th.
Wednesday 17th.
Wednesday 21st.
Wednesday 19th.

Friday 27th.
Friday 24th.
Friday 31st.
Friday 28th.
Friday 26th.
Friday 30th.
Friday 28th.

 **NOTES**



HAMVENTION - 29/30th. October. JUNK AUCTION - 26th. May. AGM - 28th. July.



1994/5

BALLARAT AMATEUR RADIO GROUP INC
BOX 1261 MAIL CENTRE BALLARAT - 3354



August

M	T	W	T	F	S	S
1	2	3	4	5	6	7
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29	30	31				

September

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31						

November

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December

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30	31					

February

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March

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April

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May

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29	30	31				

June

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July

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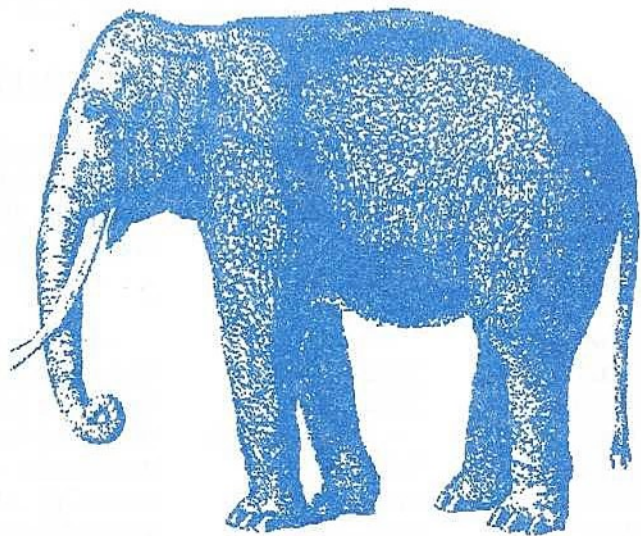
VISITORS MOST WELCOME AT MEETINGS

94/09 10

FOLLOW MY LEAD
DON'T FORGET
THE
HAMVENTION '94

TELL YOUR FRIENDS
29th. & 30th. October

BRAY RACEWAY



B.A.R.G.

THE BALLARAT AMATEUR RADIO GROUP INC.

A GROUP OF RADIO ENTHUSIASTS LICENSED TO EXPERIMENT
WITH LOCAL & INTERNATIONAL RADIO COMMUNICATIONS ON AN AMATEUR BASIS.

NEW MEMBERS ALWAYS WELCOME

10

OFFICIAL NEWSLETTER OF THE BALLARAT AMATEUR RADIO GROUP INC.

B.A.R.G. NEWS



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